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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ENTOMOLOGY  
FOREST INSECT INVESTIGATIONS

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THE MOUNTAIN PINE BEETLE

IN

MOUNT RAINIER NATIONAL PARK

A History of Recent Infestations

and Results of Control

with

Recommendations for 1935

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February 5, 1936

# THE MOUNTAIN PINE BEETLE IN MOUNT RAINIER NATIONAL PARK

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## SUMMARY

The presence of the mountain pine beetle in Mount Rainier National Park was observed first in 1914 by the ranger personnel.

Control work in the park was begun in the fall of 1925 to check an increasing infestation of the mountain pine beetle in white pine stands, but until 1930 this work was not on an adequate basis.

In 1930 and 1931, an intensive control program resulted in the thorough treatment of the Longmire and White River areas. This was followed in 1932 by a clean-up program which reduced the mountain pine beetle infestation to an endemic status.

Since 1932, annual maintenance work has held the mountain pine beetle under control in the protected areas. In certain small areas, where no control work has been done, practically all of the mature white pine has been killed as a result of mountain pine beetle activity.

The control policy is to protect the areas of high recreational value contained in the Longmire and White River units. Other areas are considered for control only as they are developed or as they affect the effectiveness of control in the protected areas.

Infestation for the 1935-36 season is considered to be endemic throughout the park with the exception of a small area near Mowich Lake where road construction has caused a disturbance resulting in an increase of mountain pine beetle infestation.

Maintenance control work and a thorough spring survey in 1936 are advocated for the Longmire and White River areas.

It is recommended, that in the future all pines and spruce felled in highway construction either be treated at once or be allowed to act as trap trees and later treated before the emergence of developing brood. This is of importance both in young stands to prevent Ips damage and in mature stands as a measure against mountain pine beetle increase.

## INTRODUCTION

This opportunity is taken to outline the history of mountain pine beetle infestation and control in Mount Rainier National Park. During the period from 1925 to 1935, an aggressive pine beetle infestation which reached a peak in 1930 and 1931 has been controlled and subsequently held in check by maintenance work. Control has been directed primarily against infestation in two areas of high recreational value, while the infestation in areas of less intensive use has been allowed to develop unchecked. The results of this control policy in the park have been most encouraging. Considerable credit belongs to the Park Service for having adequately handled a serious situation.

The historical summary is followed by observations and recommendations for the season of 1935-36.

## PART I

### HISTORY OF MOUNTAIN PINE BEETLE INFESTATION AND CONTROL IN MOUNT RAINIER NATIONAL PARK

The following historical summary has been prepared from the annual forest insect reports issued by the chief ranger's office, Mount Rainier National Park; from reports of field examinations made by members of the U. S. Bureau of Entomology and Plant Quarantine; and from correspondence and weekly reports in the files of the Forest Insect Laboratory, Portland, Oregon. This summary illustrates the progress of a mountain pine beetle infestation in Mount Rainier National Park, its control and subsequent history.

#### Early Records:

The mountain pine beetle, Dendroctonus monticolae Hopk., was observed to be present in the park as early as 1914. In that year a trail crew, including District Ranger H. B. Barnett, noted infested trees in the Ohanapecosh District. Not again until 1924 was mountain pine beetle activity sufficient to receive attention. Apparently infestation in 1924 had begun to increase alarmingly, for in the fall of 1925 the first control measures were carried out.

#### 1925 - 1929:

During the period from 1925 to 1929 inclusive, annual fall control work was done by the Park Service personnel under the supervision of Ranger Barnett. Control more or less assumed the nature of roadside clean-up and camp ground maintenance without an attempt to achieve full control by treatment of outlying infestation. The method of treatment was to fall and burn the infested trees, taking particular care not to injure nearby healthy

trees.

No funds were appropriated for this work which was done by the ranger force as a part of their regular duties. Since mountain pine beetle control was not made a separate project, the number of treated trees and the costs of treating are not on record. The only available information on this subject is that in the fall of 1928, 183 white pines were treated in the Longmire area at a cost of \$194.00, exclusive of spotting costs. It is probable that the number of treated trees and the costs of treating in the other years were comparable to those of 1928.

In 1926, the Bureau of Entomology was first informed of mountain pine beetle activity in the park. At that time, insect specimens and samples of their work were sent to the Forest Insect Laboratory at Coeur d'Alene, Idaho, for identification. The identification of the beetle and suggested control measures were furnished to the Park Service.

In September, 1928, Mr. J. C. Evenden visited the park to investigate the status of the mountain pine beetle infestation. He recommended continuance of control and some changes in control methods.

From October 8 to 11, 1929, Mr. Donald De Leon (1929) of the Coeur d'Alene Forest Insect Laboratory, made a survey and subsequently submitted a report of the mountain pine beetle situation in the Longmire and White River areas. This report contained recommendations for control and a brief account of the life history of the mountain pine beetle in the park. Epidemic tendencies were recognized in each of the observed areas. It was proposed that \$500.00 be set aside to provide for an intensive survey and control of all infested trees. Infestation in the Longmire area was considered primary and aggressive and that at White River as induced by disturbances caused by the construction of the Yakima Park highway.

1930:

Spring control was carried out under the supervision of Ranger Barnett. Work was completed the second week in July. The following is a table of the treated and untreated white pine together with the costs of treating, as taken from Ranger Barnett's control report:

<u>Unit</u>	<u>Trees Treated</u>	<u>Trees Untreated</u>	<u>Total Infested Trees</u>	<u>Cost</u>
Longmire	218	90	308	
Ohanapecosh	75	0	75	
West Side	<u>0</u>	<u>27</u>	<u>27</u>	
Totals	293	117	410	\$800

It is notable that the infested trees in the spring of 1930 were considerably in excess of estimates made the preceding fall. This was apparently a result of two factors: first, infestation was rapidly increasing; and second, red top spotting in the fall in this area is rather unsatisfactory because many infested trees have not faded enough to be evident. Presumably control was not carried on in the White River drainage because sufficient funds were not available.

During October and November of 1930, Mr. F. P. Keen and Mr. W. J. Buckhorn of the Forest Insect Laboratory at Portland, Oregon, made an intensive survey of the mountain pine beetle situation within the park, particularly in the Longmire and White River units. The report prepared by Mr. Keen (1930) is the only complete discussion of all phases of mountain pine beetle control in the park. Unfortunately this report was not widely distributed and may not at present be available to all interested parties. Since control policy, control methods, stand descriptions, and the division of the Park into entomological units were all fully discussed, it is deemed advisable to summarize Mr. Keen's report at this time. A summary of the main points follows:

1. Purpose of control: Protection of pines, particularly white pine, in Mount Rainier National Park from destruction by the mountain pine beetle is of importance to preserve certain stands of high aesthetic value in the areas of intensive use.

2. Control policy: The control policy for the park was adopted during the fall of 1930 in a conference among members of the Park Service and the Bureau of Entomology. Normally, control will be conducted only in the Longmire and White River areas where considerable stands of mature white pine exist and where recreational values are greatest. Other areas will remain untreated until they are developed or until infestations occur that threaten the protected areas. (This statement of policy has since been upheld in the general control policy for National Parks and Monuments as outlined in the National Park Service Manual of Forestry, 1955.)

3. Tree species involved and relative susceptibility: White pine (Pinus monticola), white bark pine (Pinus albicaulis), lodgepole pine (Pinus contorta), and Engelmann spruce (Picea engelmanni) are the tree species in Mount Rainier National Park that are attacked by the mountain pine beetle. They are named in order of relative susceptibility, white pine being the most susceptible. Mountain pine beetle epidemics in the park develop, for the most part, in white pine, so the problem of control primarily involves this tree species.

4. Division of the park into entomological units: White pine stands occur in more or less isolated basins separated by high rocky ridges so that control can be considered independently for at least seven different areas (see accompanying map). Mountain pine beetle control is to be conducted

primarily in the Longmire and White River units. The white pine stands are not all entirely isolated for some join at the lower elevations outside the park boundaries. This complicates control in certain instances in that infestation in adjoining areas must be taken into account.

5. Classification of white pine stands by age classes: White Pines between 50 and 150 years of age are particularly susceptible to epidemics of the mountain pine beetle. Younger trees are seldom attacked and older trees usually form such a small percentage of the stand that they do not support epidemics. Following is a table giving acreages of various age classes of white pine within the park (park area as of 1930):

Acreages of White Pine Stands Within Mount Rainier National Park

Area	more than 50% pine in stand less than 50 years of age	15% to 50% pine in stand 50 to 150 years of age	Less than 15% pine in stand more than 150 years of age	Total Acreage
1. Longmire	2,500	1,400	9,600	13,500
2. White River	300	1,600	6,100	8,000
3. West Side	200	---	9,800	10,000
4. Ohanapecoach	---	---	8,000	8,000
5. Carbon River	---	---	10,500	10,500
6. Cowlitz River	6,000	---	2,000	8,000
7. Wilderness	200	---	5,800	6,000
Total	9,200	3,000	51,800	64,000

6. Control Methods: The following methods are applicable to the treatment of mountain pine beetle infested trees in the park:

Falling and peeling -- a good method wherein the bark is removed with an axe or spud, thus exposing the pine beetle brood to the elements and predacious animals. This method, usually employed in the fall, should be directed against the young stages; otherwise the brood will fall to the ground and develop to maturity.

Falling and burning -- is a suitable method for use in treating trees containing advanced stages of the mountain pine beetle that would mature into adults even though exposed by the peeling process. The infested trees are usually felled, decked, and thoroughly burned so that no living brood remains. Ranger Barnett developed a modification of this method whereby the infested trees are cut into short length and rolled on stringers above a fire. This roasting of the beetles, barbecue fashion, offers certain advantages in protecting nearby living trees from damage and in preventing the spread of fire. Its chief disadvantage is high cost. The falling and burning method, in general, must be used with great care to prevent the spread of fire in green timber.

7. Time of control: Fall control in the park is considered superior to spring control, although each has its place. The advantages of fall over spring work are as follows:

1. No danger of early spring emergence before control is completed.
2. Fewer predators destroyed.
3. Woodpeckers concentrate on the missed trees during the winter.
4. Influences tending to attract the beetles are less effective after the intervening winter.
5. Areas more easily accessible.
6. If burning of slash is done, there is little danger of fires holding over into the fire season.
7. Work comes at a relatively slack time.

The more important disadvantages of fall control are:

1. Trees more difficult to spot, requiring a final clean-up in the spring.
2. Trees very hard to peel.

8. Infestation and recommendations: The infestation in the Longmire and White River units was considered epidemic and intensive control measures were recommended at an estimated cost of \$3,000.00. Groups of nearly a hundred infested trees occurred in each area. No control was advocated in any of the other units although a few trees were noted on the West Side and some 25 trees were reported at Ohanapecosh. Probably the estimate at Ohanapecosh was conservative because Ranger Davis (1931) mentions an infestation on Shriner Mountain that was evidently of considerable extent.

1931:

Spring control was begun in the Longmire area on March 23, and was completed on May 29. In the White River area work was initiated May 14, and completed on July 23. An account of the work is contained in a report by Ranger Davis, dated May 29, 1931.

<u>Unit</u>	<u>Number Treated Trees</u>	<u>Costs</u>
Longmire	506	\$ 950.00
White River	524	(No costs kept. Many trees used for highway rail- ing.)
Total	1,030	

The largest groups were one of 104 trees at Longmire and another of 119 trees at White River.

During the first half of September, Mr. J. A. Beal (1931) of the Forest Insect Laboratory at Portland, Oregon, made a reconnaissance of the mountain pine beetle situation within the park. He found that spring control had been both thorough and effective. Owing to the early date of observation, no definite estimate of infestation was made. Evidences of some reinestation were noted. It was suggested that a survey and an intensive clean-up be conducted in the spring of 1932. Some mountain pine

beetle activity was noted in a peculiar defoliated area along the West Fork of the White River in the Wilderness area.

Ranger Davis (1931) reported 450 infested pines in an area of three acres along Williwakas Creek in the Cowlitz area. Also some 900 infested white pines were noted in an area of 15 acres along Laughingwater Creek in the Ohanapecosh area. Control was not planned in either case because the infestations were fairly well isolated and the values involved were not high. The Ohanapecosh area was open to reinestation from the surrounding National Forest in which mountain pine beetle work was abundant. The Williwakas infestation did present the possibility that the beetles might migrate to the Longmire area and cause damage. For this reason, a close check was to be kept on the course of infestation.

A small group of infested trees along Tahoma Creek was treated as a fall clean-up project.

1932:

Control work was begun at Longmire on May 12, and completed early in June. At White River, control work was started on May 29, and finished late in June. The following information relative to spring control has been taken from a control report by Ranger Davis.

<u>Unit</u>	<u>Number Infested Trees</u>
Longmire	40
White River	150
Total	190

In a weekly report dated June, 1932, Beal reported 1,500 infested trees along Williwakas Creek. From an examination made at this time, it was

apparent that infestation had been present in this locality about five years, during which time approximately 5,000 trees, nearly all of the mature trees in a very limited stand, had been killed. Approximately one-third of the trees were killed in 1932. Two large groups along Laughing-water Creek were reported to contain a total of about 1,500 newly infested trees.

1933:

Spring control was conducted as part of the park ECW program. The number of treated trees is reported by Ranger Davis as follows:

<u>Unit</u>	<u>Number Treated Trees</u>
Longmire	45
White River	2
Total	47

Infestation at Williwakas and Chanapecosh was reported to have run its course after having killed several thousand trees in each area. Limited stands of relatively pure, mature, white pine were reduced to miniature ghost forests with a few scattered trees still dying.

Twelve infested trees were reported in the Carbon River area. Construction of a road right of way caused some disturbance in the vicinity of Mowich Lake where one group of 4 trees was noted.

1934:

At Longmire, control was started on May 16, and finished on June 4, with 52 CCC-man-days charged to the treating of 35 trees. Control was begun on May 18, at White River, and continued into June, during which time 108 CCC-man-days accounted for the treatment of 61 infested trees. Along the

newly constructed West Side Highway approach to Mowich Lake, 26 trees were treated during May with the expenditure of 55 CCC-man-days. The following table gives the number of treated trees and the estimated costs:

<u>Unit</u>	<u>No. Treated Trees</u>	<u>CCC-Man-Days</u>	<u>Total Cost at \$2.00 per CCC-Man-Day</u>
Longmire	35	52	104.00
White River	61	108	216.00
Carbon River (Mowich Lake)	<u>26</u>	<u>55</u>	<u>110.00</u>
Totals	122	215	430.00

Infestation was considered to be at low ebb throughout the park owing to continued maintenance work. The infestation near Mowich Lake was attributed directly to the disturbance caused by highway construction.

#### 1935:

No control work was done in the Longmire and White River areas because very few infested trees were present. Control work was continued in the vicinity of Mowich Lake. During June, 11 trees were treated. Between October 7 and October 18, 20 additional trees were felled and burned. In all, 61 trees were treated in 294 CCC-man-days at a cost of \$588.00. The high cost of control in this area was the result of adverse weather conditions in October and the fact that the men were transported a long distance from camp.

Two examinations of the park were made, the first in May by Keen and Furniss and the second in October by Furniss. The observations and recommendations are incorporated in Part II of this report.

#### Historical Summary:

A review of the mountain pine beetle control in Rainier National Park serves to bring out certain points that are of considerable interest

and perhaps wide application.

The infestation from 1925 through 1929 was recognized as serious and control measures were initiated but were not adequate to cope with the increasing pine beetle population.

Increased efforts to check the beetles in 1930 were again unsuccessful due chiefly to an inadequate control program.

A very thorough control program in 1931 followed by an intensive clean-up in 1932 and subsequent maintenance from year to year has resulted in the reduction of the pine beetle population to an endemic status in the protected areas, Longmire and White River.

It has been demonstrated that it is possible to conduct successful control operations at a reasonable cost in small isolated units, although some infestation may exist in nearby areas.

The destruction of nearly all the mature white pine in relatively pure stands along Williwakas and Laughingwater Creeks demonstrates what may be expected in the more valuable stands at Longmire and at White River if control is not maintained.

Experience in the park illustrates that disturbances caused by highway construction result in a concentration of pine beetle activity which may develop into an epidemic status if control measures are not fully provided.

## PART II

### REPORT OF THE PINE BEETLE SITUATION FOR 1935 BY AREAS

During the period from October 8 through October 17, 1935, an examination was made of most of the white pine areas within the park. Every possible accomodation was extended by members of the Park Service. The following is a discussion of the pine beetle situation by areas.

#### Longmire:

This area has not only received the greatest recreational development but also contains approximately half of the 50 to 150 year old white pine which is especially susceptible to mountain pine beetle attack. Longmire is one of two areas within the park in which maintenance of pine beetle control is advocated.

Because of the uneven topography of the park, the method of locating infested trees is necessarily a "red top" survey, whereby the fading or sorrel trees are located from observations points and later visited to determine the exact number of infested trees. Certain points in the Longmire area have proven very satisfactory, so much so that it may be well to point them out for the use of anyone who is not already familiar with the work. A good pair of field glasses is very necessary for this type of survey.

(1) Longmire headquarters affords an excellent view of the southeastern slope of Ramparts Ridge, as well as the slopes of Eagle Peak, although but few pines occur on the latter. (2) Ricksecker Point commands a general view of practically all of the pine stand in the Nisqually basin. (3) Ramparts Ridge trail at several points along the crest of the ridge affords a

view of the plateau at the south end of the ridge; also, the western side of the Kautz drainage. (4) At a point 2.1 miles from the Nisqually road on the Kautz trail, it is desirable to climb a tree to obtain a view of Tumtum Mountain and the eastern side of the Kautz drainage. (5) Several places along the West Side road afford an opportunity to observe the east side of the Tahoma Creek basin where the pine beetle-susceptible trees in this drainage occur. It is not advocated that observations be limited to these points, but it is considered that most of the area can be covered from these places and then if conditions warrant, it is desirable to cover the area more fully.

In 1930, large groups of infested trees appeared on Ramparts Ridge in the Longmire unit and it was only by prompt action on the part of the Park Service that most of the pines were saved. Since then, annual maintenance work has kept the beetle in an endemic state so that only a few trees are lost each year. The importance of a continuous check of the beetle population is well illustrated by what occurred in a group of trees located high on Ramparts Ridge, in October of this year. In this group, one 18 inch tree was lightly attacked by the mountain pine beetle, emergence of which took place in 1934. Beetles, probably emerging from this tree, attacked three 12 to 20 inch trees and four less than 12 inches in the vicinity. The attack was light, but in the summer of 1935, emerging beetles, probably from these trees, attacked six 12 to 24 inch trees and three less than 12 inches. Attack on these nine trees was heavy. Brood in October, 1935, was in the egg and small larval stages. Thus, in the course of two years, the

pine beetle population in this group built up from a light attack in one tree to a heavy attack in nine trees. (Since my examination, 11 additional infested trees have been located in this group). The serious possibilities that are illustrated by this example are apparent.

The group of infested trees on Ramparts Ridge has been marked for treatment in the spring. No infested trees were located in Kautz Creek basin, on Tumtum Mountain, or along Tahoma Creek, nor were there any noted above Longmire along the Nisqually River. Fairly good weather conditions prevailed, so the actual infestation should not be much in excess of that noted; probably not more than 30 trees need treating in this unit. The presence, however, of one group makes it very desirable that a close check be kept of the insect conditions next season.

White River:

This closely approaches the Longmire area as to recreational value and likewise contains approximately half of the mountain pine beetle-susceptible white pine within the park boundary. There are also some white bark pine, ledgepole pine, and Engelmann spruce which, like the white pine, are attacked by the mountain pine beetle.

No particular observation points are recommended for this area, but it is fairly easy to cover from various points on the road and from the ridges. The selection of lookout points awaits more favorable weather conditions.

Disturbances caused by the construction of the Yakima Park highway are no longer effective and since intensive control was completed in 1932, no serious situation has developed.

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October 1938

MEMORANDUM ON AN EXAMINATION OF THE 1938 MOUNTAIN PINE BEETLE  
SITUATION IN MOUNT RAINIER NATIONAL PARK

PURPOSE

During the period of October 20 and 21 the writer visited Mount Rainier National Park to make an examination of the mountain pine beetle (Dendroctonus monticolae Hopk.) situation in the scattered white pine stands, and to discuss control plans with Park officials. Surveys conducted by Park Rangers and reported by Chief Ranger O. A. Sedergren in the Annual Forest Insect Report, October 9, 1938, revealed five active spot infestations, totaling approximately 1040 trees on 38 acres.

RESULTS

In company with Ranger Hall, the Deer Creek infestation was visited, while that near the headwaters of Laughingwater Creek was viewed from a distance. With Chief Ranger Sedergren the small group of trees along the Mowich Lake road was examined. The other two groups, containing but few trees in undeveloped areas, were not visited.

The largest concentration of the mountain pine beetle is to be found near the headwaters of Laughingwater Creek, in an area in which they have been active for several years. In a mixed pine stand 569 trees had been marked on 18 acres and 300 trees estimated on 15 acres in an adjacent fork of the creek. This activity is progressing up the steep slopes and has nearly reached the summit of the ridge marking the Park boundary. A small group of dying trees was noted across the creek in a previously uninfested portion of this mixed stand, about a half mile north of the marked trees.

A very satisfactory control project was just being completed by a CCC crew on the Deer Creek infestation. Approximately 110 trees on 3 acres had been treated by the peeling method. The character of this work was such that this infestation should be practically eliminated, and unless this area is subject to reinestation from surrounding sources, further control work should not be necessary.

Approximately 35 trees in a mixed white pine stand constitute the present infestation along the Mowich Lake road. This has been in progress since the road construction work started in this vicinity.

RECOMMENDATIONS

In keeping with the previously established insect control policy of the Park, no control work is warranted in the Laughing-water Creek infestation, since this has been in progress for several years and is in a back zone not intensively used. I would like to visit this area in the spring in order to determine the status more accurately and the possibilities of its continuance.

A recheck should be made on the Deer Creek control project to ascertain whether all of the infested trees have been spotted. If any are found, they should be treated in order to eradicate the infestation.

The small group of trees along the Mowich Lake road should be treated as early in the spring of 1939 as possible, either by peeling the logs, or decking and burning, depending on the developmental stage of the beetle. At the same time the area should be recruised to make sure all infested trees have been spotted and treated.

Respectfully submitted,

(signed) J.M.W.

J. M. Whiteside,  
Assistant Entomologist.

Observations in this unit were seriously hampered by adverse weather conditions, including low lying fog which obscured much of the country. However, most of the white pine belt was seen and no newly infested trees were noted. This agrees with observations made during the summer by members of the Park Service. It is probable that some infested white pines exist in the area, but it is certain that no serious condition is present.

Two white bark pines near the lodge at Yakima Park were observed to contain some mountain pine beetle brood in the large larval and pupal stages. These trees had been located by the Park Service, and should be treated before emergence in the spring. The survey of the White River area, although not as intensive as was desirable, indicates the presence of very few beetle-killed trees. Park Service personnel should check the situation in the spring before flight begins in order to be able to do any treating that may be necessary.

West Side:

The new road to Mowich Lake enters this unit from the north. It was along this road that more newly infested white pines were seen than at any other place within the park. Construction of this road illustrates the same situation that was consequent to the construction of the Yakima Park road and the West Side highway. White pines along the roadside have been injured by blasting and by being partly covered in fills. In addition, some windthrow occurred in October, 1934.

As a result of these conditions, the mountain pine beetle population increased rapidly during 1934 in a small basin of white pine timber near

Greenwood's Camp about two miles from Mowich Lake. 41 trees were treated during the first half of June, 1935, in this area. An additional 20 trees, mostly in one group, were treated during October. Not all of the marked trees were treated when the control project was ended because of the advent of winter. Brood was in the egg and small larval stages. Larvae and new adults of Ips were present in the tops of several of the trees. There is some top killing by Ips which leads to confusion in a red top survey because the bases of these trees are often green.

Only an imperfect conception of the extent of the white pine in this basin and the total amount of infestation was obtained through the snow and low lying clouds. An estimate is made of 50 to 75 overwintering brood trees, including the 20 already treated. Since control has been initiated in this area, a thorough spring clean-up should be made. Numerous injured white pines are still unattacked and will probably prove good breeding material for a year or more, necessitating maintenance work. This area along a new road is certain to receive increasing recreational use and is thus deserving of protection from the pine beetle, although this has not been previously advocated owing to lack of development.

#### Chanapecosh:

For the most part, white pine occurs in this area as scattered individuals in a mixed coniferous stand. No control has been advocated in the past, other than campground maintenance. A fairly extensive infestation in the past was allowed to run its course because this area was little developed and because it is open to reinfestation from the surrounding area. At present it is being considerably developed, but the relatively light stand of white

pine and the fact that it is still open to reinestation from the surrounding territory still makes it a poor control possibility.

Just north of the new bridge (near Chanapecosh Checking Station) and to the west of the new road, is a group of white pine killed by the mountain pine beetle. Six trees contain a few large larvae and new adults, but are mostly abandoned; four contain larvae, pupae and a few new adults, but no emergence has taken place; one contains eggs and small larvae only. Although adjacent to the new road, none of these trees were injured. However, it was noted that in the clearing of the right of way, one or more white pines were felled and left without treating. Mountain pine beetle brood developed in these logs and apparently attacked the nearby pines. Two additional infested trees were noted near the end of the road that is being constructed toward Stephens Canyon. These trees were both injured by blasting and now contain large larvae and new adults of the mountain pine beetle.

Low lying clouds at the time of examination made visibility in this area extremely poor, but it can be expected that a more or less scattered infestation exists as a result of the highway construction. Probably about 25 trees are involved. No control is proposed other than that which may be necessary to clean up the camp ground.

Carbon River:

Scattered white pine and considerable spruce are present in this unit but no infested trees were observed during the fall examination. Should infestation become present it would of necessity occur in scattered trees, and it is unlikely that control would be needed other than camp ground and roadside clean-up.

### Cowlitz River:

A very fine stand of young pine exists in this unit but practically no trees are of age to attract mountain pine beetle attack. A road is being extended from Reflection Lakes through Stephens Canyon to connect with the Ohanapecosh road. If this right of way goes through the young pine tract, it will be desirable to dispose of the slash to avoid Ips damage which is very likely to develop from such material.

A few trees are reported from the Williwakas area but inasmuch as the beetles were allowed to kill approximately 5,000 trees in years past in this basin, without damage to surrounding areas, it is considered unnecessary to do any control work at this time.

### Wilderness:

Although this area was not visited personally, the Park Service reports that 15 infested white pines occur in an area along the West Fork of White River, where defoliation occurred some years ago. Since this area is proposed as a primitive area in which the forces of nature will be allowed to follow their course, control has no place in its management.

### Recommendations:

It may be well here to make a suggestion concerning right of way clearing in the future when such right of way involves the cutting of mature white pines or other species attractive to the mountain pine beetle. Preferably, felling should be done in late summer or in the fall. Felled trees, pines and spruce, should be peeled or burned in order to make them unfavorable as breeding places for the mountain pine beetle. There is a possibility of using such felled trees as trap trees to absorb any beetles that might be attracted to the area. Such trap trees would have to be

thoroughly treated after attack and before brood emerged. This method in the park appears to be attendant with some hazard to nearby trees, because of a surplus of beetles in the surrounding areas, which, when attracted to such material, arrive in such great numbers that they not only fill in the down logs but also attack surrounding living trees.

Recommendations, as discussed under the several units, are as follows:

1. Longmire -- intensive survey in the spring, followed by maintenance control of about 30 trees.
2. White River -- intensive survey in the spring and treatment of at least 2 white bark pines near Yakima Park Lodge.
3. West Side (Mowich Lake) -- intensive survey and thorough clean-up of infestation along the new highway. Between 50 and 75 infested overwintering brood trees are estimated. About 20 of these have already been treated.

REFERENCES

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## MOUNT RAINIER NATIONAL PARK

WHITE PINE TYPE MAP SHOWING MOUNTAIN PINE BEETLE CONTROL UNITS

White pine stands less than 50 years of age;  
not susceptible to mountain pine beetle attack.

White pine stands 50-150 years of age;  
very susceptible to mountain pine beetle attack.

Mixed conifers with scattered white pine 150-300 years of age; not subject to epidemic losses.

